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IMAGING FOR RESIDENTS

Repaired Ulnar Collateral Ligament of Elbow

Yi-Chian Wang

Department of Physical Medicine and Rehabilitation, National Taiwan University, Taiwan

A case of elbow disorder

This 22-year-old man was a professional baseball pitcher, and had received ulnar collateral ligament (UCL) repair surgery 2 years ago. He had kept pitching for 8 months after completing the post-surgery rehabilitation but felt medial elbow discomfort again in recent months, especially during the arm deceleration phase. There was no obvious discomfort when he used his right arm for daily activities. The clinician arranged elbow X-ray (Figs. 1,2), magnetic resonance imaging (Figs. 3,4), and musculoskeletal ultrasound examination for him.

The MRI showed mild effusion in the left elbow joint and metallic anchor fixation at the medial epicondyle of the left distal humerus with focal subcortical cyst formation. Magnetic susceptibility artifacts were noted at the coronoid process of the left ulna due to an old injury of the medial collateral ligament. The overall impression was an old injured ulnar collateral ligament with post-operative changes.

Fig. 1

Fig. 2

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Fig. 3

Fig. 4

Image interpretation

The musculoskeletal ultrasound examination was performed with a 18 MHz linear transducer. A hyperechoic plaque with acoustic shadow was noted between the common flexor tendon and ulnar collateral ligament. (Fig. 5. The posture demonstration was photographed by another volunteer.) In Fig. 6, the ulnar collateral ligament (anterior band) showed markedly increased thickness but intact internal fibrillary structure. One linear hyperechoic structure was observed between the two layers of ulnar collateral ligament, and suture material was suspected. The posterior band of ulnar collateral ligament (Fig. 7) showed markedly increased thickness and hypoechoic change, compatible with grade I sprain.

Distal to posterior band of ulnar collateral ligament, one hyperechoic plaque with posterior acoustic shadow was

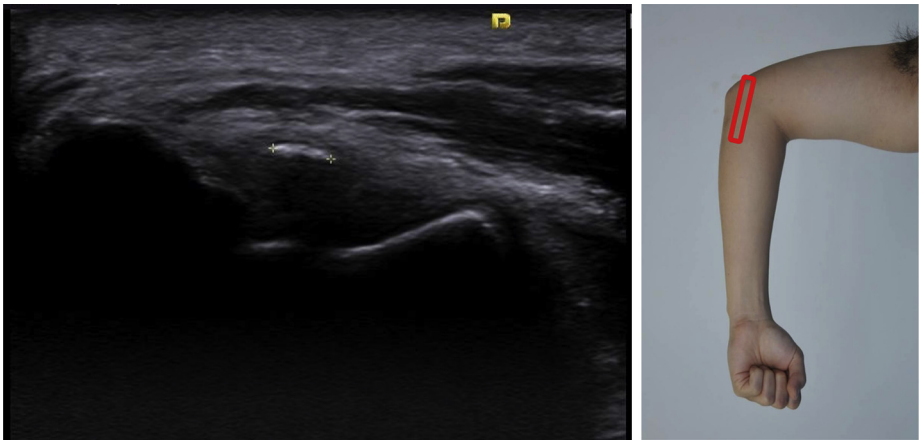

Fig. 5

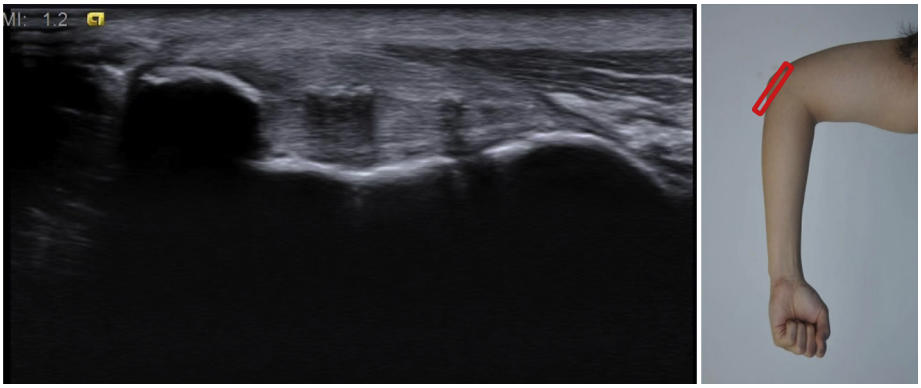

Fig. 6

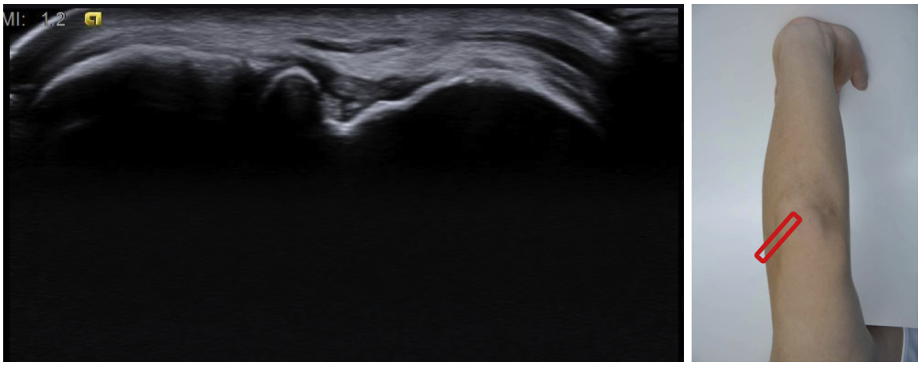

Fig. 7

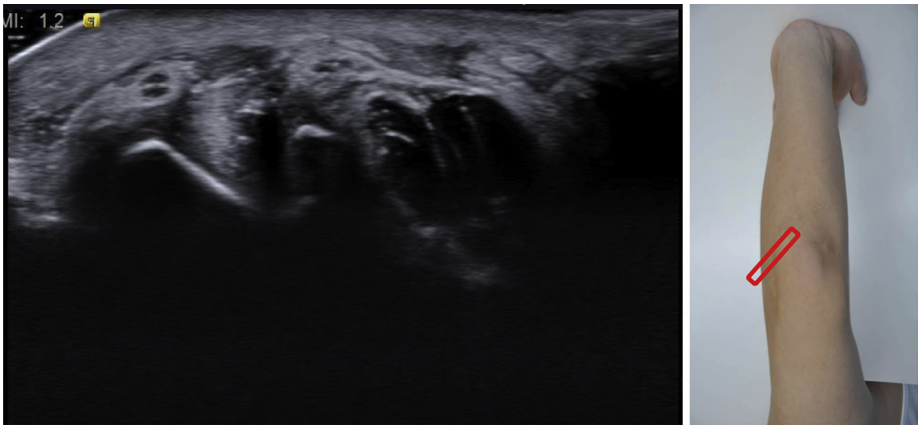

Fig. 8

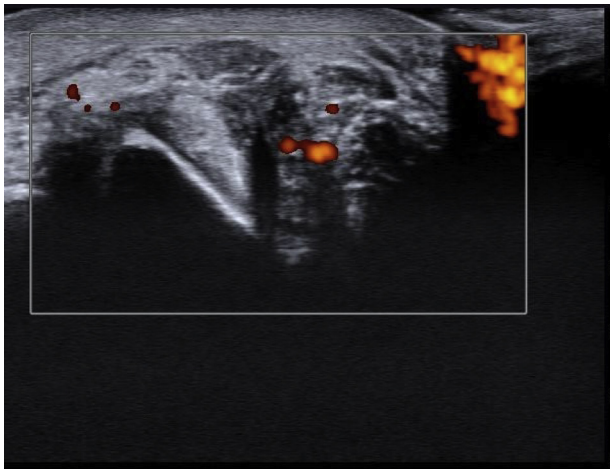

Fig. 9

noted between the olecranon and medial epicondyle, compatible with patient's tender point (Fig. 8). Under power Doppler mode examination, persistently increased blood perfusion (grade II) was observed at the hyperechoic plaque (Fig. 9). The impression was a recent chip fracture at the medial aspect of posterior trochlea, deep and distal to UCL posterior band, with actively inflammatory sign.

Anterior band of ulnar collateral ligament is prone to injuries in over-head sports. Some researchers proposed that new surgical techniques offer the elite athletes a high chance of 90% to return to pre-injury performance [1]. In a clinical study [2], ultrasound examination with a 7.5 MHz linear transducer can diagnose UCL injury at 88% sensitivity and 83-91% specificity. In an cadaveric study [3], ultrasound examination with a 10-12 MHz linear transducer provide equivalent diagnostic power to non-contrast MRI (1.5T, 3 mm section thickness, 0.3 mm section gap). More recently, ultrasound examination for UCL injures with a higher frequency transducer combined with valgus stress dynamic examination skill may offer even better diagnostic power than MRI [4,5]. The musculoskeletal ultrasound can detect tiny injuries, obtain dynamic images, and correlate with patient complaints at real-time, and is gaining its popularity in sports medicine [6].

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